Rebuttal to the pro statement

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Rebuttal to the Pro Statement

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The efficacy of altitude training (living high-training high; LHTH) was originally contested because, as appropriately stated in the introduction of the seminal "live high-train low" (LHTL) study, "when appropriate control groups have been included, living and training at altitude have not been proven to be advantageous compared with equivalent training at sea level" (Levine and Stray-Gundersen, 1997). Evaluating the efficacy of the LHTL model is no different. When appropriate (live low–train low; LLTL) control groups are included, does living and training at altitude prove to be advantageous over the equivalent living and training at sea level? Hitherto there is principally one such (nonblinded) study that supports LHTL over LLTL (Levine and Stray-Gundersen, 1997). Alternatively, there are numerous studies that repeatedly fail to demonstrate an improvement in sea-level performance following LHTL when compared to equivalent LLTL, as stated in my original position (Jacobs, 2013). Many of these studies have been inappropriately referenced in support of the LHTL model (Wilber, 2013): 1) Maximal aerobic power ($\dot{V}O_{2max}$) and volume of oxygen consumed ($\dot{V}O_2$) in a 2 minute all-out effort actually diminished significantly in the LHTL group, while the corresponding LLTL values were unchanged. However, there were no differences between groups and the corresponding work output did not changed for either group (Gore et al., 2001); 2) While $\dot{V}O_{2max}$ improved in the LHTL group, "no statistical difference was observed between the two groups during the study" (Brugniaux et al., 2006); 3) The 2.0% increase in maximal speed achieved during a maximal anaerobic running test in LHTL subjects "did not differ significantly from the 1.4% increase" observed in the LLTL group (Nummela and Rusko, 2000); 4) $\dot{V}O_{2max}$ increased in the LHTL and LLTL groups "to the same extent" (Schmitt et al., 2006); 5) Following two separate LHTL blocks, when "compared with the (LLTL) group, the LHTL group was substantially faster (in a 4.5 km running time trial) after block 1 but possibly slower after block 2", and there were no significant differences in the change in mean $\dot{V}O_{2max}$ or running velocity at $\dot{V}O_{2max}$ (Robertson et al., 2010); and 6) The ratio of maximal mean power output obtained during a 30 minute cycle ergometer test to that of a 4 minute test "decreased for (LHTL) (76 ± 2%) after sleeping at altitude but improved for (LLTL) (82 ± 4%) after normal training" (Martin et al., 2002). There is undeniable and overwhelming evidence refuting the efficacy of LHTL.

Author Disclosure Statement

No competing financial interests exist.

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